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Technical cooperation activities of the United Nations system in the field of water resources

Report of the Secretary-General

Summary

The present report provides information on the technical cooperation activities of many of the agencies in the United Nations system in the field of water resources undertaken since 1998. It also provides reference to the analytical and normative activities of the United Nations system in water resources development and management. The report touches on the evolution of technical cooperation in water resources over the past decade, which has enabled United Nations agencies to act in a support role to Governments. The United Nations technical assistance is concentrated to the area of capacity-building.

The report provides details of assistance provided by a number of United Nations organizations in support of socio-economic development in such areas as integrated water resources management, water supply and sanitation, water for sustainable urban development and the mitigation of water-related natural disasters. Since integrated water resources management is intertwined with the protection of aquatic ecosystems, information management, capacity-building and financing, information is also provided on programmes to support Governments in their efforts to protect and manage their water resources through the protection of water quality and ecosystems, information management, capacity-building and financing. The report concludes with some lessons learned by the United Nations agencies over the years.

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I. Introduction

1. In its decision 1999/277, the Economic and Social Council adopted the provisional agenda and documentation for the second session of the Committee on Energy and Natural Resources for Development. Item 5 of the Committee's agenda concerns the strengthening of and coordination of the activities of the United Nations system in the field of water resources, and a report of the Secretary-General on technical cooperation activities in the field of water resources development has been mandated under that item. The preparation of the report was entrusted to the Department of Economic and Social Affairs, in its capacity as secretariat of the ACC Subcommittee on Water Resources.

2. The main activities of United Nations entities in the field of water resources are: (a) data gathering/analysis and preparation of studies and reports; (b) organization and servicing of meetings and workshops; and (c) technical cooperation, including advisory services and field projects. The present report will concentrate on activities under item (c).

3. The present report provides information on the technical cooperation activities of many of the agencies in the United Nations system in the field of water resources undertaken since 1998. The report of the Secretary-General on activities of the organizations of the United Nations system in the field of freshwater resources (E/C.17/1998/3) covers technical cooperation activities, as well as analytical and normative activities under items (a) and (b) above. The present report updates the information on technical cooperation of some agencies, with brief reference to the analytical and normative activities of the United Nations system in water resources development and management.

4. There has been considerable evolution of technical cooperation during the past decade. In the early 1990s, the United Nations Development Programme (UNDP) made a serious effort to shift project execution from United Nations agencies to national agencies. United Nations agencies now play more of a support role, providing technical advisory services, building technical capacity and strengthening institutions in water resources, at the request of Governments. The value of the United Nations agencies has been in helping to define global and regional agendas and assisting Governments in formulating policies and strategies in water resources management. In recent years, better integration of their own analytical, normative and technical cooperation activities has enabled most of the agencies of the United Nations system to provide a better supportive response to countries concerned with implementing the commitments of major United Nations conferences, such as the International Conference on Water and the Environment (Dublin, January 1992) and the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992). As a result of the decline in project funding from UNDP, many United Nations agencies have begun to seek financial support from other sources, in particular bilateral donors. This has changed the level and form of cooperation within the United Nations system and in some cases has resulted in competition for the same sources of bilateral funds.

II. Activities of the ACC Subcommittee on Water Resources

5. The ACC Subcommittee on Water Resources is composed of over 20 entities of the United Nations system involved in the field of freshwater resources. The Department of Economic and Social Affairs of the United Nations Secretariat serves as the secretariat for the Subcommittee and provides substantive servicing of its annual sessions. The Subcommittee reports to ACC through the Inter-Agency Committee on Sustainable Development (IACSD). As approved by IACSD in June 1994, among its main functions the Subcommittee has to enhance coordination among the entities of the United Nations system in the field of water resources; to assist in the preparation of reports for the Commission on Sustainable Development, the Committee on Energy and Natural Resources for Development, the Economic and Social Council, the General Assembly and other intergovernmental bodies; to formulate common strategies and joint programmes among the organizations of the United Nations system; and to provide a mechanism for a dialogue with international, regional and bilateral organizations, as well as with active non-governmental scientific and professional organizations.

6. The Subcommittee has also been mandated to monitor and review progress in the implementation of the Mar del Plata Action Plan and chapter 18 of Agenda 21. In that regard, at its fourteenth session, the ACC Subcommittee agreed that the Department of Economic and Social Affairs would act as a focal point

for integrated water resources development and management; the United Nations Educational, Scientific and Cultural Organization (UNESCO) and the World Meteorological Organization (WMO) for water resources assessment; the World Health Organization (WHO) for protection of water resources, water quality and aquatic ecosystems and for drinking-water supply and sanitation; the United Nations Centre for Human Settlements (Habitat) for water and sustainable urban development; the Food and Agriculture Organization of the United Nations (FAO) for water for sustainable food production and rural development; and WMO for impacts of climate change on water resources. With regard to cross-cutting issues, it was agreed that the International Research and Training Institute for the Advancement of Women (INSTRAW), the United Nations Children's Fund (UNICEF) and UNESCO would act as focal points for women's communication, education and research, respectively. Major recent outputs of the Subcommittee include the publication of various regional water resources assessments in 1991 in connection with the implementation of the Mar del Plata Action Plan; the organization of the 1992 International Conference on Water and the Environment (Dublin); the publication of the *Comprehensive Assessment of the Freshwater Resources of the World* in 1997; the organization of an expert group meeting on strategic approaches to freshwater management, held in Harare 1998, in preparation for the sixth meeting of the Commission on Sustainable Development; and the recent preparatory process of the forthcoming *World Water Development Report*.

7. The ACC Subcommittee met in March 2000 in a special session held at The Hague. It agreed that greater efforts should be made to seek additional resources from donors, particularly for concrete activities, such as the preparation of the forthcoming biennial *World Water Development Report*. The Subcommittee agreed that efforts would be made to monitor national and international implementation (as opposed to compliance), not only through the *World Water Development Report* but also through other activities related to the review of chapter 18 of Agenda 21. The Subcommittee also agreed to look into the relationship between freshwater and gender.

8. Collaboration of the members of the Subcommittee with potential donors has actually recently occurred in the case of initiatives in the areas of arsenic contamination of drinking water sources and the preparation of the initial groundwork for the *World Water Development Report*.

III. Technical cooperation activities of the United Nations system in the field of water resources

9. The magnitude of the involvement of organizations of the United Nations system in the field of water resources can be appreciated from the expenditures on technical cooperation activities of the main funds and programmes. UNDP finances technical cooperation activities in integrated water resources development and management in all developing country regions; it is currently funding 168 water resources projects in 67 developing countries and those with economies in transition, for a total amount of US$ 335 million. The World Bank also provides loans and technical assistance to many ongoing projects in water resources development, capacity-building and management in many developing countries. For the years 1998 and 1999, the World Bank had made funding commitments of $4,300 million for 66 projects, over 40 per cent of which went to the East Asia and Pacific region. Two thirds of the World Bank's funding for water resources projects was in the area of institutional development and environment. Another 22 per cent was concentrated in the urban water supply and sanitation area. In addition, the grants and concessional funds disbursed by the Global Environmental Facility (GEF) from 1992-2000 in the international waters focal area provided $399 million in grants for 47 water-related projects. This was accompanied by another $419 million in co-finance from other sources.

10. UNICEF has historically played a leading role in providing water supply and sanitation and in supporting the capacity-building of Governments and communities in over 100 countries in its efforts to increase access to safe drinking water and environmental sanitation. In 1999, UNICEF expenditure for water supply, environment, sanitation and hygiene education programmes amounted to an estimated $70 million. The UNICEF-supported country programmes helped an estimated 9 million people gain access to improved water and helped an estimated 5 million people to sanitation facilities in 1999. Over the 1990-1999 period, UNICEF investments in water

supply, environment, sanitation and hygiene education amounted to some $952 million, including nearly $250 million for emergency interventions.

A. Integrated water resources development and management

1. Support for national integrated water resources strategies

11. The Department of Economic and Social Affairs has been involved for many years in developing strategies for integrated water resources development and management in the context of the implementation of Agenda 21. The Department promotes integrated water resources planning and management, using the natural water basin as a reference unit. An essential element of its approach is to consider socio-economic and hydro-environmental systems as mutually dependent and to understand the interrelationships between them. Environmental protection and equitable allocation of often limited and vulnerable water resources suffer from a lack of integrated and dynamic planning and management. Governments need to play a leading role in preserving water for future generations, and stakeholders need to be closely associated in planning and implementation stages. An expert group meeting on strategic approaches to freshwater management considered and made recommendations on four cross-cutting issues for integrated water resources management: water as the key resource in sustainable development; freshwater ecosystems and water quality; economic and financial issues; and participation and institutions for integrated water resources management.

12. Participatory planning and management of water resources, based on sound information and decision-aid tools, are essential to avoid conflicts, to properly allocate and make efficient use of resources and to solve complex environmental problems. Capacity-building and exchange of experiences are required to help economies rapidly achieve sustainable growth, to maintain aquatic ecosystems and to resolve conflicting demands on limited water resources.

13. The cross-sectoral and multidisciplinary approach takes into account competitive water resources uses for rural and urban water supply and sanitation, irrigation, industry, recreation, hydropower, navigation, fishing and for sustaining aquatic ecosystems, and is based on diagnostic studies and on an interactive dialogue among stakeholders. That approach allows national authorities to define policies and strategies for integrated water resources management.

14. The Department is providing technical support to many nationally led water management programmes. For example, in Ethiopia assistance is being provided for the preparation of the Government's water sector development programme. The federal water policy and national water code have been developed by the Government, and reflect strong political commitment to improve the overall management of water resources in Ethiopia. The Government has formally established an inter-sectoral committee composed of senior level officials and chaired by the Minister of Water Resources. As this is a participatory process, the involvement of NGOs, donors and the regional water bureaux are essential. The Department is also assisting in many other water management initiatives. For example, in the Syrian Arab Republic, assistance has been provided to conduct a comprehensive analysis of the water sector in order to support national experts and authorities to identify priorities and set recommendations for an integrated water resources management programme, based on sustainable development principles. Proposed components for strengthening institutional and technical capacities include local pilot demonstration projects (in irrigation management, urban water supply management and controlling/mitigating industrial pollution); basin-level water management; strategic planning and institutional coordination; and human resources development. The Department is providing similar technical advisory services on these types of sustainable development approaches to Chad, Côte d'Ivoire, Madagascar, the Niger, and Yemen.

15. The Economic and Social Commission for Asia and the Pacific (ESCAP) carried out a survey of existing water allocation policies and regulations in all the countries of the region in 1999. The project, entitled "Optimum water resources allocation among water-use sectors for sustainable socio-economic development", was funded by the Government of the Republic of Korea. A regional workshop on the allocation of water resources among water-use sectors was held in Bangkok in February 2000 to exchange information and experience on the principles and policies of water allocation and to review and adopt the draft water allocation policies and strategies for use by

the countries. A publication on this subject is being prepared for wide dissemination.

16. Moreover, a joint FAO/ESCAP regional project on consolidating experiences in the region from the World Water Vision consultation process was formulated in late 1999 and its pilot phase is currently being implemented by ESCAP, with financial resources provided by FAO. The pilot phase includes case studies and round-table workshops of experts to discuss priority programmes of action for successful implementation of the respective national water visions, including water for food and rural development, in four selected countries: Malaysia, the Philippines, Thailand and Viet Nam. The pilot phase is scheduled to be completed by the end of June 2000.

2. Protection of water resources, water quality and aquatic ecosystems

17. Actions are also needed to protect the health and productivity of the aquatic environment, and impacts on human health resulting from degraded water resources. There are economic, social and environmental consequences from the degradation of freshwater resources and aquatic ecosystems. These include impacts on food production and human health. Efforts to design and implement strategic approaches and plans for urban and rural sanitation and for wastewater treatment at the pollution source need support in developing countries and countries in transition.

18. A project of the Department of Economic and Social Affairs in Estonia concentrates on hazardous substances in freshwater and in the coastal marine waters. This project is assisting the Government of Estonia to formulate a three-year programme for collecting basic information in order to take decisive actions to remediate polluted surface and groundwater resources of the country, including land-based pollution of coastal areas. The programme is designed to address three interdependent problems: (a) lack of systematic knowledge on the extent, magnitude and sources of water contamination by hazardous substances in Estonia and its coastal zones; (b) insufficient institutional capacity at national and local levels — design and implement remediation strategies; and (c) inadequate public awareness of hazardous substances in the aquatic environment. The programme gives special importance to groundwater resources, as they are widely used for domestic water supply.

19. WHO, FAO and the United Nations Environment Programme (UNEP) have collaborated in the joint Panel of Experts on Environmental Management for Vector Control (PEEM) since 1981. Habitat joined the group in 1991. While the Panel of Experts itself is currently suspended, certain activities are still carried out under the interim arrangements.

20. An area of increasing interest in the WHO/FAO/UNEP collaboration is that of alternatives to the use of dichlorodiphenyltrichloroethane (DDT) for malaria vector control, against the backdrop of the ongoing intergovernmental negotiations on persistent organic pollutants (POPs). A UNEP guidance document on alternatives to POP pesticides, under preparation with inputs from FAO (integrated pest management) and WHO (vector control), will address environmental management measures, in particular in water resources development.

21. Health impact assessments have been a key theme in the work of PEEM. Such assessments aim to reduce the adverse health effects of development, including water resources development, through a methodology that covers the identification of vulnerable groups and of health hazards in a specific project; the definition of environmental and institutional risks; and the development of mitigating measures that can be incorporated in the design, construction or operation of the project. Implementation of health impact assessment procedures critically depends on an enabling policy framework at the national level.

22. In recent years, PEEM has organized national seminars on the review and adjustment of water resources development and management policies to incorporate health considerations (Benin, 1993; Zambia, 1996; Malawi, 1998; Ecuador, 1999). Reports are available from the PEEM secretariat, located at WHO headquarters in Geneva.

23. Inter-agency collaboration under PEEM also focuses on setting the agenda for multidisciplinary research on environmental management measures for health promotion and protection in water resources development projects. It also identifies partner institutions, assists in resource mobilization and coordinates scientific backstopping as research is carried out. Support is being provided by PEEM to a consortium of research institutions in Denmark and the Philippines on a research proposal on environmental

management for irrigated rice production areas in the Philippines to control schistosomiasis transmission.

24. Two relevant publications initiated by WHO/FAO/UNEP/Habitat/PEEM are: *Water Resources: Health, Environment and Development* (1999) *and Dams and Disease: Ecological design and health impacts of large dams, canals and irrigation schemes* (1999), which, among other things, reflects PEEM's involvement in the health issues of dams built on the Senegal river basin.

3. Information management

25. Adequate collection, storage, processing and presentation of information are a critical component of integrated water resources management. Strategic approaches to information management for integrated water resources management need specific support. Given existing financial constraints in many countries, the optimum information requirements for effective integrated water management planning at the local, basin, national and international levels need to be defined with a view to maximizing the value of the information gathered.

26. Required changes in information management and dissemination to enable a country to integrate hydro-environmental and socio-economic data need also to be established and supported, as well as methods of rationalizing and enhancing data monitoring networks, data archiving. Technical capacity needs to be strengthened in order to make medium to long-term predictions of water availability and use and resource balances. New information technologies can be used inside countries and between countries, as a tool to exchange information on good practices and develop regional cooperation.

Water resources assessment

27. Assessment of surface water and groundwater are systematically included in all technical cooperation programmes supported by the Department of Economic and Social Affairs for water resources management. This is being done in, for example, Yemen and Madagascar.

28. Technical cooperation activities of the International Atomic Energy Agency (IAEA) cover isotope applications in a broad spectrum of fields, involving hydrogeological investigations of groundwater occurrence, subsurface flow, transport dynamics and hydraulic interactions; applications in geothermal systems; surface waters; local scale hydro-engineering applications (including sediment transport dynamics in rivers and estuaries, sedimentation in lakes and reservoirs, study of leakage losses from hydraulic structures); and analytical work related to isotope hydrology.

29. While the Agency's subprogramme on water resources involves continued research and development efforts for improving and refining isotope methodologies, as well as dissemination of information in that specific field, the technical cooperation programme provides the main avenue for wide applications in member countries. The effort in recent years to extend the use of isotope hydrology for water resources development and management has resulted in a considerable increase of support to technical cooperation projects — there are currently 160 projects in 63 countries, with total budgetary allocations of US$ 20 million over the last 10 years.

30. For the 1999-2000 cycle, 28 national and six regional new technical cooperation projects were included in the field of isotope hydrology. This involved 48 member States and a total budgetary allocation of US$ 6.7 million. Together with the ongoing projects from the earlier cycle, a total of 55 technical cooperation projects are being implemented during the 1999-2000 cycle.

Water Resources Learning Network

31. The Department of Economic and Social Affairs has recently received Development Account funding to establish a network of distance learning centres for training in water resources development and management, initially in Africa. The objective of the project is to develop national capacities that will promote the development and implementation of national water strategies in developing countries, at the local and basin levels. The promotion of integrated water resources development and management, in practice, will be carried out through: (a) a network of national capacities; and (b) a water virtual learning centre geared towards building national capacities and focused on water supply in underserved areas (rural and peri-urban) and on management of shared river basins.

Software for water resources management

32. In the Niger, an integrated water information system has been developed by a team of national and international experts for the Ministries of Water Resources and of Environment. The system is within the framework of a UNDP-financed Department of Economic and Social Affairs project, entitled "Planning, development and management of groundwater resources of the Republic of Niger". The system has been developed as the main support to prepare the first water master plan of the country and is used to monitor the implementation of the plan to respond rapidly to variations in planning scenarios and natural hydro-systems.

33. Similar systems have been developed in Mali, Senegal, and the Central African Republic. Comprehensive information systems are being developed in Yemen and in Madagascar. All systems are tailor-made to respond to country characteristics and needs in terms of systems on which national staff has been trained and software being used in the country. The common features of these systems are that they are integrated, can work at different scales and are easily adaptable by national staff trained to that end.

4. Capacity-building to enhance participatory approaches and improve institutional and regulatory frameworks

34. The Department of Economic and Social Affairs, working with Governments and UNDP, has implemented technical cooperation projects aimed at building national capacities that incorporate principles of sustainable development, centred on people. These projects aim at integrated water resources development and management, within national policies, strategies and programmes for water resources development. These coordinated initiatives are being carried out in a number of developing countries and regions, with the support of the Department, including Yemen, Zimbabwe and many other countries of Africa and Western Asia.

35. In Yemen, the Department has implemented a programme on sustainable water resources management over the past four years, with a total budget of almost $14 million. This programme aims at capacity-building for integrated water resources management, in support of the Government's effort to create an independent national water resources authority to regulate and control the use of its water resources, seriously depleted by overexploitation and anarchic development. The authority is now the main body for policy-making, planning and the management of water resources. It also provides advice as a donor coordinator for the water sector. Its main focus is on: the development of legal and institutional frameworks; water resources assessment, monitoring and control; demand management and public awareness; the decentralization of management responsibilities to regional and local levels; and the preparation of all relevant documentation for decision makers and users. Capacity-building is achieved through the implementation of 13 regional management plans for the efficient use of water resources, in areas facing acute water problems. The experience gained in these efforts will then be used in formulating sound national water resources management policy and implementing strategies and in continuing the planning process for the remaining nine regions.

36. A project of the Department of Economic and Social Affairs in Zimbabwe aims at capacity-building for sustainable water resources management. The Government of Zimbabwe has undertaken major reforms in the management of its national and international water resources, and capacity-building is needed at all levels to ensure an effective implementation of its water resources management strategy. This project aims to build full managerial and technical capacities of the newly formed Zimbabwe national water authority and to ensure sustainable development and management of Zimbabwe's water resources. It includes strengthening technical capacities for policy development, and for operation and maintenance of the national hydro-meteorological monitoring network. Support for effective stakeholder participation and institutions for integrated water resources management is necessary to achieve the goal of sustainable water management.

37. The Department also provides technical support to similar capacity-building projects aimed at enhancing participatory approaches in Chad, the Syrian Arab Republic, Ethiopia and the Niger basin. In Chad, the Department has assisted the Government, under the authority of the Prime Minister, to establish a mechanism composed of a multisectoral technical committee and a national committee for water management, representing 10 ministries and four representatives of users and elected people. Those two

committees are reporting to the existing national commission for the environment. All major projects, and strategic decisions, related to water resources, are progressively to be reviewed by those committees.

38. In the Syrian Arab Republic, the Department is promoting and defining, through three local demonstration projects, efficient and safe water management in irrigation, industrial pollution control, and urban water supply, a mechanism linking those local experiences with the regional/basin and the central/cross-sectoral levels.

39. In Ethiopia, the Department is supporting a one-year consultative process between local actors and eight regional technical committees, and between the committees and those responsible for the preparation of the water sector development programme. The exercise will be guided through regional meetings involving representatives from the central level, from regional authorities and experts from various sectoral groups, including water planning, agriculture and health. Relevant actors from the private sector will be invited to participate.

40. In the Niger river basin, the Government of Mali and the Niger basin authority hosted, with the support of UNDP and DESA, a meeting on the theme "Holistic and sustainable management of Niger basin resources". Representatives of eight riparian countries of the Niger river basin (Benin, Cameroon, Chad, Côte d'Ivoire, Guinea, Mali, the Niger and Nigeria) attended, as well as regional and international organizations, multilateral and bilateral donors, users, professional associations and NGOs. Interactions between development and environment were discussed, as well as ways and means to promote people-centred sustainable development in practice throughout the basin, including a participatory approach and institutional reforms at regional level.

41. Under the PEEM activities referred to above, WHO/FAO/UNEP, with their collaborating centres, the Danish Bilharziasis Laboratory and the Liverpool School of Tropical Medicine, have developed and tested a training course entitled "Health opportunities in water resources development", which aims to develop the skills of middle-level managers, working in different agencies, to participate effectively in the intersectoral development dialogue, and to ensure that environment and health issues are addressed in a timely manner, resulting in improved sustainability of water projects. The course was held in Zimbabwe, Ghana, the United Republic of Tanzania, Honduras and India, and reports are available from the PEEM secretariat. Capacity-building using that course is being extended to regional institutions in sub-Saharan Africa, through the Eastern and Southern Africa Management Institute, in order to offer the course in its permanent training programme.

42. ESCAP and the Netherlands technical cooperation programme have organized training courses on thematic maps in geology for urban planning and on geographic information systems in geology for urban planning. These training courses were attended by geo-scientists and planners, and highlighted the pertinent geo-information that needs to be communicated to decision makers. At the same time, techniques and methodologies to organize and present relevant geo-data in a user-friendly format have been shared at such training events. The training courses were held in 1998 and 1999, and served to bring participants up to date on the latest developments and to make them aware of the urgent need for close collaboration between the earth science and planning communities.

43. A capacity-building project executed by ESCAP and funded by the Development Account focuses on strategic planning and management of natural resources development (including water resources) and environmental protection in developing countries in the Asia and Pacific region. The project, to be implemented from 2000 to 2004, is expected to produce the following outputs: guidelines on strategic planning and management of natural resources development and environmental protection, including 10 country studies; five regional workshops, for the five subregions of ESCAP, to train a core group of about 100 experts for the networks; and 15 national workshops to train about 300 persons in the application and implementation of the guidelines.

5. Financing of water resources development and utilization

44. Given its crucial importance to sustainable water resources development and management, the mobilization of financial resources at the local, national, regional and international levels must be a top priority. Efforts to generate and utilize financial resources efficiently need specific support and promotion of good practices. These include action

proposals for Governments and the international community on water-pricing policies and appropriate cost-recovery schemes that would better reconcile equity and efficiency goals; specific proposals on how public and private actors could be both regulated and engaged in the cost-recovery effort; and the identification of priorities and strategies at the local, national and international levels, for the generation and efficient use of financial resources.

45. Issues where political commitment at different levels would make a difference include service-pricing policies, tax redistribution and cost-recovery schemes that better reconcile equity and efficiency aspect; proposals on how to enable and regulate the role of civil society, municipalities, public and private actors in demand-led water operations and finance; and the generation of additional national financial resources to promote rural water supply and urban sanitation. The technical support of the Department of Economic and Social Affairs has been provided to define, plan or implement such efforts in Madagascar, the Niger and Mauritania.

46. An illustrative example of local mobilization of financial resources combined with private-sector involvement is provided by a technical cooperation project designed and assisted by the Department in a remote area of Mauritania (the Hodhs). Until recently, drinking water was supplied by unsustainable and poorly maintained hand pumps installed years ago in 90 villages. Maintenance was supposed to be provided by the administration in the capital, Nouakchott, but there was access neither to spare parts nor to repair persons. At the end of the technical cooperation project, more than 90 per cent of the villages were autonomously funding the maintenance of their pumps, with trained help from the local private sector (repair persons, spare parts traders, etc.) and supervision by local and national authorities in charge of water resources.

B. Drinking water supply and sanitation

47. Mandated to assist countries in fulfilling the basic needs of children, including the supply of safe water and sanitation, UNICEF has a large portfolio of water and environmental sanitation and hygiene education projects. These are currently carried out in some 81 countries through regional and field offices and in cooperation with multilateral agencies, Governments and non-governmental organizations. Most water, environment, sanitation and hygiene education programmes and resources are concentrated in Africa, South Asia, and Latin America and the Caribbean. UNICEF country programmes focus both on advocacy for strategic changes in sectoral policy and on programme implementation with both Governments and large sectoral agencies. In the context of child and human rights, many UNICEF country water and environmental sanitation programmes emphasize improved access for marginalized communities.

48. Within the framework of its water and environmental sanitation strategies (approved in 1995), the shift in UNICEF water and environmental sanitation programming towards an increased focus on environmental sanitation, hygiene education and behavioural change continues to gain ground at the country level. In 1999, more than 50 UNICEF offices were involved in hygiene promotion. Within the context of the child-friendly school initiative and to increase the enrolment of girls and reduce drop-out rates, more than 35 countries were managing school sanitation and hygiene programmes in 1999, almost double the number in 1997. To improve the quality, the advocacy potential, and the real involvement of education and community stakeholders in these programmes, UNICEF has launched a two-year pilot project (2000-2001) to test and disseminate successful methodologies and lessons learned in this important new area.

49. UNICEF has entered into formal partnerships with several other United Nations organizations in the hope of increasing national, regional and global cooperation. For example, the WHO/UNICEF joint monitoring programme on water and sanitation was launched in 1990; the WHO-UNICEF joint strategy on water supply and sanitation was approved by the WHO-UNICEF Joint Committee on Health Policy in May 1997; and a collaborative agreement with the World Bank on water supply and sanitation in Africa was recently signed.

50. Collaboration within and outside the United Nations system has always been key to UNICEF programme implementation. For example, in the UNICEF-supported Guinea worm eradication programme in Africa and Asia, UNICEF works in close partnership with such institutions as: Global 2000 of the Carter Center, WHO, the United States Peace Corps and the Centers for Disease Control, as well as with

several donors, such as the Norwegian International Development Agency, the Canadian International Development Agency, the United States Agency for International Development and NGOs.

51. In the context of exploring new partnerships, UNICEF and the Worldwide Fund for Nature launched a study on freshwater for India's children and nature, which was the starting point for a more extensive cooperation at national and regional levels to promote community management of water resources and to establish the fundamental importance of overall ecosystem conservation.

52. The Department of Economic and Social Affairs also carries out technical cooperation projects in the field of rural water supply and of national sanitation programmes. For example, in Morocco the Department, in cooperation with other organizations, is executing projects on rural water supply, national strategy and master plan for urban sanitation.

C. Water for sustainable urban development

53. Within the context of its geology for urban planning programme, ESCAP periodically convenes the Forum on Urban Geology in Asia and the Pacific to discuss, *inter alia*, the adverse impact of groundwater overexploitation in mega-cities of the region, on land subsidence and recurrent flooding. The aim is to improve coordination among local government departments dealing with surface and groundwater resources, and to provide effective inputs from geo-science institutions in the land-use/urban planning process.

54. With funding from the Netherlands, ESCAP hosted the fourth session of the Forum early in 1999 and reiterated the need to guard more closely underground freshwater resources from pollution due to ill-informed solid waste disposal at unsuitable sites. These and other problems affecting groundwater resources as well as urban flooding and relevant countermeasures were described in two publications, both issued in 1999: *Urban Geology in Asia and the Pacific*, volume 10, and *Urban Geology of Dhaka, Bangladesh*, volume 11.

55. Advisory missions were fielded to urban areas in the Islamic Republic of Iran, Pakistan, Kazakhstan and the Lao People's Democratic Republic to help identify common problems and solutions, and to stimulate the creation of semi-permanent urban geology units with the explicit task of advising local authorities on how to avoid the above-mentioned adverse effects of ignoring natural (hydro) geological conditions in fast-growing Asian cities.

D. Water for sustainable food production and rural development

56. According to the most recent FAO estimates, agriculture accounts for 70 per cent of all water use (85 to 95 per cent in developing countries). Irrigation represents less than 20 per cent of cultivated land but contributes 40 per cent to overall food production.

57. Conditions of physical water scarcity exist in the Near East, North Africa, East Asia, Northern China and parts of Latin America, while economic/financial water scarcity is prevalent in sub-Saharan Africa and in other developing countries of Latin America and Asia.

58. Under these circumstances, there are two main issues for FAO: (a) water conservation in agriculture (more crop per drop) requires a significant improvement of local water management and the mitigation of adverse effects of irrigation (waterlogging and salinity); and (b) because of intensifying intersectoral competition for raw water, water resources management has to be integrated across natural units, economic sectors and administrative jurisdictions. This integration requires multidisciplinary implementation, with strong partner organizations to assist in the monitoring of implementation, the financing of investments and the fundamental operational research to improve the performance of irrigated agriculture.

E. Water-related disasters, including floods and droughts

59. The relationship between water and natural or man-made disasters should be fully taken into account within national development strategies as an integral component of disaster prevention and mitigation plans. This relationship can be seen from two perspectives: the occurrence of water-related disasters caused by hydro-meteorological extremes, such as droughts and floods, and the destruction of infrastructure and contamination of water sources by earthquakes,

volcanic activity, tidal waves, land and mud slides, among others, and also by disasters of a technological nature. The failure to limit environmental degradation resulting from human intervention increases the vulnerability of risks posed by water-related natural disasters. Major technological and other disasters with an adverse impact on the environment can be a substantial obstacle to attaining the goals of sustainable development.

60. Natural disasters have disproportionate consequences for developing countries, in particular small island developing States and countries with extremely fragile ecosystems. There is a particular need for capacity-building in disaster prevention planning and management and the facilitation of the transfer of early-warning technologies to countries prone to disasters.

61. The substantive orientation of international concerted action in the disaster reduction domain is encompassed in the International Strategy for Disaster Reduction, proposed by the Secretary-General in pursuance of the Economic and Social Council decision on successor arrangements for the International Decade for Natural Disaster Reduction (IDNDR). The Inter-Agency Task Force for Disaster Reduction is an important new institutional arrangement established under the Strategy that introduces a strong call for inter-agency cooperation and coordination to implement the new programme that has succeeded IDNDR.

62. The secretariat of the United Nations Convention to Combat Desertification in those Countries Experiencing Drought and/or Desertification, particularly in Africa in cooperation with international institutions and development cooperation partners, assists affected developing countries in formulating action programmes at the national, subregional and regional levels. At the regional level, country parties have identified the management of water resources as a priority area in the context of the implementation of the Desertification Convention.

63. In Asia and Africa, that theme is considered to be of major concern. The secretariat of the committee has therefore been requested by the countries concerned to facilitate the launching of a consultative process towards the establishment of thematic programme networks in the field of water resources management.

64. In Africa, the consultation process started in September 1998 through the convening of a regional workshop on the promotion of a network on integrated water resources management. As a follow-up to the recommendations of the workshop, a regional thematic programme network for the integrated management of international river, lake and hydrogeological basins was set up and a launching meeting organized in March 2000. The role of the network is to strengthen the capacity of African institutions specialized in the integrated management of water resources with regard to the objectives of the Desertification Convention through information-sharing among member institutions; build partnership agreements to ensure that proposed activities are based on existing programmes; and implementation of the water resource management component of the regional action programme for Africa. The Water Sector Coordination Unit of the Southern African Development Community, based in Maseru, Lesotho, has been selected and designated as institutional focal point for that network.

65. In Asia, priority fields of activities were established in 1997 in Beijing. One of the six thematic programme networks focuses on water resources management for agriculture in arid, semi-arid and sub-humid lands. The overall objectives are to promote cost-effective approaches to the use of scarce water resources; to minimize further soil degradation caused by salinization; and to test methodologies for the reclamation and use of already degraded soils. Seen in a regional context, the network will endeavour to make use of existing expertise in the region, to expand exchange of information within and outside the region, and to facilitate the implementation of joint projects. It is foreseen that a water resources management network will be established by a focal point institution that has extensive experience in the field. A few countries have already expressed their interest to designate one of their relevant institutions to function as focal point for the network.

66. A regional cooperation project on flood control and management in Asia and the Pacific was implemented by ESCAP in 1998/99 to review practices and related experience in the region at the regional, national and river basin levels. The project was implemented in conjunction with the fiftieth anniversary of the establishment of the Bureau of Flood Control (now the Water and Mineral Resources Section) of ESCAP and also as part of ESCAP's inputs

to the preparation for the closing of the International Decade for Natural Disaster Reduction (IDNDR). In the context of this project, a regional workshop was held in October 1998 in Bangkok and a special publication was produced, *Regional Cooperation in the Twenty-first Century on Flood Control and Management in Asia and the Pacific*.

67. ESCAP continued to provide support in the monitoring of annual water-related disasters in the subregion. Within the framework of cooperation between the IDNDR secretariat and ESCAP on mitigation of water-related natural disasters, a regional survey was conducted and a review study was made as part of the preparation for an IDNDR-ESCAP regional meeting for Asia, risk reduction and society in the twenty-first century, which was held in Bangkok in February 1999.

68. ESCAP also continued to assist the Typhoon Committee and the WMO/ESCAP Panel on Tropical Cyclones in their respective annual operations related to the mitigation of water-related natural disasters, including the formulation of a subproject on the mitigation of disasters from debris flow and landslides. ESCAP also provided technical advisory services and inputs to the Typhoon Committee on assessing impacts of El Niño phenomenon in the Typhoon Committee subregion, at a workshop held in Macao, China, in June 1999.

IV. Conclusion

69. Capacity-building in water resources planning and management is a long-term process, which cannot be achieved within a time-bound project. Planning should not be viewed as a rigid "bureaucratic" exercise but rather as a dynamic process, which goes far beyond the top-down approach of central government services and their technical staff to involve users and their representatives. Disappointing results from the implementation of some existing plans have been caused primarily by the lack of ownership of the decision-making process by the most interested parties and by the lack of donor coordination for the implementation of action plans. Thus, water resources planning and management requires time and participation of stakeholders. Nonetheless, operational activities can proceed simultaneously with the planning process, and need not wait for a formal plan to be completed.

70. Governments should continue to play a central role in creating an enabling environment for the complex management of national water resources. Adaptation to a free-market economy and moves towards "privatization", lack of funds and/or previous mismanagement should not justify or encourage a "hands-off" policy. Delegation of too much responsibility to the private sector or to NGOs could lead to supply shortages, high prices or poor quality. Governments ought to continue the promotion of a coherent and integrated policy with regard to water resources. Important governmental responsibilities should remain: in regulating water allocations for different uses of water; in ensuring quality control in the production and distribution of potable water; in liquid waste management and reuse; for dam security, flood protection and prevention; and in ensuring a fair balance with regard to water tariffs, avoiding monopoly situations. The preferable working unit should be defined at the most convenient level of natural units (a hydrologic basin or a group of basins or sub-basins, an extended aquifer system or a conjunction of both, as can best be defined on the basis of current knowledge). Environmental protection should define objectives of water quality for rivers and lakes and protect base flow of streams to protect water-dependent fauna, flora and aquatic ecosystems. Flexibility to adjust to situations from the points of view of water quantity and quality as well as good linkages with other regulations on land use are also recommended. Financing of these services should not be only through more income tax levees or direct payment by users but rather through fees paid by the beneficiaries as a function of the volume of water used and of the pollution loads ejected. Such fees can also be used to assist communities in carrying on necessary investments.

71. Sound planning and management of water resources need to be solidly anchored on reliable information systems. Strict standards for data collection should be established since it has proven more costly to go back on a site and verify dubious information than to collect it properly in a timely way. Data-screening techniques exist, and computer technology can assist in identifying erroneous raw data, but there are situations when this information needs to be collected again when feasible. Any verification work is time-consuming and costly. The current use of geographical positioning systems (GPS) to control or elaborate coordinates of measurement points represents a great step forward. The use of GPS should be

encouraged by teams working in the field, either to generate positioning of new sites or to verify old information. Also, reliable information for water planning and management should include socio-economic data on needs, not as assessed by technicians but as expressed by users, and on current arrangements for allocation among user groups. Basic economic data and information on traditional water uses and water rights are required by the planning process. Socio-economic information may not be adequate and may have to be acquired from other sources, such as the national census, employment statistics, trade and other economic data.

72. At the institutional level, improved coordination and cooperation among the organizations of the United Nations system involved in the field of freshwater resources can greatly increase the effectiveness of system-wide technical cooperation activities, particularly in developing countries. This is clearly illustrated by the ongoing inter-agency initiatives under the aegis of the ACC Subcommittee on Water Resources in the area of arsenic contamination of drinking-water sources and in preparation of the *World Water Development Report*, which will involve close cooperation with national institutions in the areas of information management and capacity-building for data collection and analysis. In addition, the arsenic contamination initiative highlights the importance of rapid system-wide responses by a lead agency or a small group of United Nations organizations when urgent technical cooperation issues are identified.